Sensors and Automation
## Honeywell Wireless and Sensing Project

Honeywell International is serving as the lead organization for a multi-part project that will help ITP's Sensors and Automation Activity further its goal of developing integrated measurement systems for operator-independent control of manufacturing processes

Wireless Network for Secure Industrial Applications

For this project, researchers will examine several promising wireless technologies and select the one most likely to meet the demanding requirements of industrial production lines.

The selected technology will be tested at multiple sites to see how well it satisfies the key considerations of operational reliability, sustained performance in harsh environments, invulnerability to interference, security and bandwidth efficiency, and other factors that are critical for the ultimate wide-spread deployment of robust wireless sensor networks in manufacturing. In addition to production line measurement and control, the anticipated low-cost of this technology will enable wireless sensors to be used to determine energy- and environmental-related process parameters that are not traditionally monitored.

The resulting Wireless Network for Secure Industrial Applications (WNSIA) will build on everyday cell phone technology to transmit data from sensors to the control system, and then

Integrated Wireless Sensor
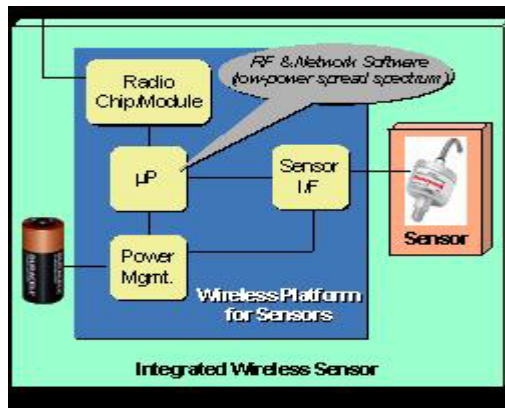
into advanced control applications. It will result in an open architecture system that incorporates robust radio communications, flexible network protocols, and security features needed for the large-scale deployment of low-cost industrial wireless sensors.

Process Stream Sampling and Composition Analysis

This project will develop and demonstrate innovative technology for sampling and composition analysis of gaseous and liquid process streams. The developments produced by this project will directly lead to reduced process upsets, energy consumption and environmental emissions, as well as enhanced economic competitiveness. The project will develop and test two technologies: A revolutionary, compact, fast and low-cost gas composition microanalyzer (PHASED), and a new, modular, networked, intrinsically safe and standardized process stream sampling and measurement system (NeSSI).

Applications and Benefits

WNSIA benefits: Applying wireless network technology to steam traps, electric motors, and steam injection systems used in oil production is expected to save an estimated 192 TBtu annually.
NeSSI/PHASED benefits: This technology will enable more cost-effective sample validation, quality control, and environmental compliance, resulting in reduced life-cycle costs to design, build, and operate the sampling systems.

Project Participants

For WNSIA:
Honeywell International (Lead Organization), Adcon, Alcoa, Axonn, ChevronTexaco, Ember, EPRI, Honeywell Specialty Materials, iAculum, NIST, NTRU, and Omnex.
For NeSSI/PHASED:
Honeywell International (Lead Organization), Caviton, Inc., University of Illinois, ExxonMobil, DowChemical, DuPont, Air Products, and Universal Oil Products.

Contact

Steve Huseth
Honeywell DOE Wireless and Sensing Program Manager
Phone: (612) 951-7340
Email:
Steve.huseth@honeywell.com

Project Plans and Progress

*Project History***:** This project was awarded under the Sensors, Controls and Automation Crosscutting Technologies solicitation. The award was signed in the spring of 2004.

WNSIA

To carry out the WNSIA project, researchers will:
- Define project technology and demonstration requirements.
- Create the overall system design and the components for the system, then build the components.
- Integrate and test system components.
- Build demonstration equipment (such as demonstration sensors).
- Perform field demonstration system integration and systems lab testing.
- Perform field demonstration testing.

NeSSI/PHASED

For NeSSI, end-user team members will:
- Design and develop the NeSSI-II/-III installation, including safety checks and test protocol.
- Install these systems and interface with the available analytics.
- Monitor, evaluate, and report on the performance of their NeSSI-II/-III systems.

For PHASED, researchers will:
- Design a version of PHASED-IIIA suitable for industrial-grade ruggedness and reduced power consumption that includes systems analysis support.
- Design PHASED-IIIB, to include integrated, on-chip MDDs, optimized geometry and adsorber film, with systems analysis support.
- Fabricate PHASED-IIIA and MDDs chips, as well as the needed test electronics, software, and PHASED-operator interface upgrades. Fabricate PHASED-IIIB chips with on-board MDDs.
- Test and characterize the performance, via lab tests, of PHASED-II, PHASED IIIA, and PHASED-IIIB devices with a number of test gases such as house nitrogen, room air, natural gas, and special test-gas mixtures.